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Environmental Desk Study

1A Doughty Mews, London

June 2008

Document Control

Client	T Levring
Document Name	Environmental Desk Study
Date submitted	June 2008
Submitted to	T Levring London Borough of Camden
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Reviewer	R Thornton
Signed on behalf of Blue Signal Ltd	

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APPENDICES

0 Executive Summary

Current Site Status	Site currently has no permanent structures. Site is generally level and is located in a predominantly residential area. A residential premises with some commercial use is proposed for the site, the details of which are currently unconfirmed.
Site History	Site has been used as a vehicle maintenance garage since circa 1952. Prior to this, the site was undeveloped.
Geology Hydrogeology Hydrology	Site overlies Hackney Gravel and London Clay. Site is in an area classified as a minor aquifer. Groundwater is located at approximately 4.0m below ground level. No watercourses in the vicinity of the site; a former tributary of the River Fleet is located just to the north of the site and has been backfilled.
Site Investigations	A site investigation was undertaken on the site in September 2006.
Test Result Summary	The investigation identified moderate contamination in the soil and groundwater underlying the site. Soil contamination was limited to marginally elevated heavy metals; slightly elevated hydrocarbons were detected in the groundwater.
Recommendations	Based on information available to date, the overall risk is such that no further soil sampling be undertaken. However, a number of additional recommendations are proposed prior to construction of any buildings on the site including: • Verification of removal of a disused underground waste oils tank; • Checking for asbestos; • Suitable ventilation measures designed into the building.
Proposed Remediation	Based on current information available, soil in proposed garden/landscaped areas be replaced with clean soil.

1 Introduction

1.1 Background

Blue Signal Ltd ('BSL') has been appointed by Troels Levring to undertake a Desk Study review of a disused commercial property located at 1A Doughty Mews, London (the 'site'). The property is currently disused and is understood to have been occupied by a motor vehicle maintenance garage; the site is not understood to have been used for vehicle refuelling purposes. The building on site has recently been demolished and the site is currently clear of buildings. The site is the subject of a recently granted full planning permission (Ref 2004/4733/P). Condition 6 of the permission states that a site investigation should be undertaken to determine the potential soil and groundwater contamination associated with the site. The condition has been placed in the permission in accordance with policy EN10 of the London Borough of Camden Unitary Development Plan 2000.

The future structure proposed for the site is currently unconfirmed but is likely to comprise predominantly building footprint with minimal external open/landscaped areas.

This report provides an assessment of the historical environmental data available for the site including:

- A recently undertaken (September 2006) site investigation report produced by Geotechnical and Environmental Associates Ltd ('GEA');
- discussions with the Contaminated Land Officer of Camden Council;
- the Camden Council web site for details of the site history;
- published geology and hydrogeology maps for the area; and
- the Camden Council website www.camden.gov.uk where information on site history is provided.

Site details are as follows:

Site Name:	Former motor vehicle maintenance garage
Address:	1a Doughty Mews, London, WC1N 2PG
National Grid Reference:	530750, 182130

1.2 Purpose of this Study

The objectives of this study are to determine the history of the site and the potential for contaminated land to be present on the site. It is intended to use this information to assess the potential constraints to the proposed development on the site.

This report has been completed in accordance with the requirements set out in PPS23 (Ref 1).

1.3 Information Sources

The main source of information used for this study has been the site investigation report provided by Geotechnical and Environmental Associates Ltd (GEA) which included a 'Sitecheck' report from Landmark Group followed by an intrusive site investigation (the text of the report is provided as Appendix A).

1.4 Report Structure

The following sections of this report contain:

- a description of the site status;
- a description of the site history;
- an assessment of the potential contaminants present on the site and environmental liabilities associated with the site;
- a review of the 2006 site investigation; and
- conclusions and recommendations.

2 Site Description and Characterisation

2.1 General

The information provided in the Landmark 'Envirocheck' report indicates that the land uses in the vicinity of the site are limited to residential with some commercial (offices) use. The site is located in an area of extensive paved areas with very little open space in the vicinity of the site. Vehicular access to the site is via Doughty Mews.

Two deciduous trees are located on the site.

2.2 Site Details

The general details of the site are as follows:

Table 2.1 Site Visit Record Sheet

SUBJECT	INFORMATION
Current site size and uses	Site is approximately 15m by 20m and is currently occupied by open ground.
Adjacent land uses	Predominantly residential housing with some commercial use (offices).
Name of adjacent roads/rivers/canals	Site bounds Doughty Mews and Roger Street in Central London.
Level of ground in relation to adjacent areas and other parts of site	The site and land surrounding the site is generally level.
Present day potentially contaminative activities	Site currently disused but has previously been used as a vehicle maintenance yard.
Security of site	Site currently secure.

2.3 Geology and Hydrogeology

The Geological Survey map of the area indicates that the site is underlain by Hackney Gravel which is underlain by London Clay. The Hackney Gravel is predominantly clayey in structure and is considered likely to have a low to moderate permeability; the London Clay has a very low permeability. In the event of any liquid spillage on the site, it is considered unlikely that significant infiltration of the soils is likely to have occurred. The site is located on

a minor aquifer indicating that there are moderate quantities of groundwater available beneath the site.

2.4 Hydrology

There are no surface water bodies located in the vicinity of the site. The closest watercourse is the River Thames which is located approximately 1,500 m to the south of the site.

There is also understood to be, an infilled tributary of the River Fleet located just to the north of the site as evidenced from historical maps.

3 Site History and Potential Contaminants

3.1 Introduction

The site history was assessed using the data provided by the Sitecheck report commissioned as part of the September 2006 site investigation. The information has been summarised below. The history of adjacent land uses is also discussed.

3.2 General Site History

1877 Site is shown to be undeveloped at this time although surrounding areas appear to be developed with predominantly residential housing.

1916 – 1952 At some point between these dates the site was developed as a commercial property. The former garage building is shown to be present on the 1952 map.

1952 – present The layout of the site appears to have remained unchanged from 1952.

The site does not appear to have undergone any structural changes since the construction of the garage building in 1952.

3.3 Potential Contaminants

3.3.1 Introduction

The following sections outline the principal forms of ground contamination which may be present on the site based on the previous light industrial use.

3.3.2 Potential Contaminants On Site

The activities undertaken within a vehicle maintenance garage will typically generate waste hydrocarbon-based materials including petrol, diesel and waste oils. There is also the potential for heavy metals to be present from engine bearings, asbestos from break linings and a range of solvents for degreasing.

Although there is a risk of some leakage of hydrocarbons from the activities on site, these are considered to be minor and are considered unlikely to reach any surface water course.

3.3.3 Potential Contaminants on Adjacent Sites

There are no other industrial land uses in the vicinity of the site. In addition, there are no landfills or waste management sites within 500m of the site.

3.3.4 Site Sensitivity

Given the presence of low-permeability geological strata beneath the site, the absence of considerable quantities of groundwater and the presence of residential properties in the immediate vicinity, the site is considered to have a **moderate environmental sensitivity**. The main potential vulnerable receptors in the area are considered to be the Minor Aquifer

and local residents. However, given the small scale of the site and the presence of a considerable thickness of concrete, it is considered likely that any polluting incident on the site would have had minimal impact on the surrounding residents.

3.4 Conceptual Site Model

In accordance with current published guidelines (Ref 2) and best practise, a conceptual site model (CSM) has to be developed for the site. This model identifies potential sources of contamination and assesses potential unacceptable risk to identified receptors through the concept of source-pathway-receptor linkage. Given the data currently available, the following table identifies the potential risks associated with the site:

Source	**Pathways**	**Receptors**
Hydrocarbons from the on-site car maintenance activities.	Downward and lateral migration of contaminants via leaching through soils, lateral migration of contaminants in groundwater off-site and on-site inhalation of vapours from groundwater indoors and outdoors.	Groundwater, site users.
Historically infilled land to the north of the site (former river tributary).	Downward and lateral migration of contaminants via leaching through soils.	Groundwater.

3.4.1 Discussion of Conceptual Site Model

The sources, pathways and receptors identified in the above table are discussed in more detail below:

Sources

Due to the activities undertaken on the site, it is considered likely that ground contamination has occurred on the site. The nature of the fill material to the north of the site is unknown and may potentially be contaminated.

Pathways

The site is located on low permeability strata and therefore the risk of leaching of contaminants through soils is considered to be low, particularly as the site has a considerable surfacing of concrete.

Receptors

The Minor Aquifer and local residents are considered to be the main sensitive receptors in the area, however, due to the absence of a pathway (as it has been broken by the provision of hardstanding and engineered drainage), the potential risk to the Aquifer is considered to be low. Risks to site users are low due to the potential dispersion of any vapours arising from the activities on site. The potential contamination of the aquifer due to the infill material is not known.

3.5 Summary of Conceptual Site Model

The site is in an area of residential use and adjacent to an which has historically been subject to infilling with unknown materials. A complete source-pathway-receptor relationship could be present due to the potential for contaminants to have penetrated the hard surfacing of the yard. This depends to a large extent on the integrity of the hardstanding. Although this is not known, the fact that the site does not appear to have undergone any significant changes or redevelopment (evidenced from historical maps), the integrity of the hardstanding can be assumed to be relatively uncompromised.

The proposed future use of the site is offices/residential, booth of which are considered uses unlikely to result in further ground contamination.

The development of the site for the proposed use is considered to meet the The Government's objectives for contaminated land as set out in DETR Circular 02/2000, Contaminated Land. These are:

- to identify and remove unacceptable risks to human health and the environment;
- to seek to bring damaged land back into beneficial use; and
- to seek to ensure that the cost burdens faced by individuals, companies and society as a whole are proportionate, manageable and economically sustainable.

In summary, the source-pathway-receptor model would to be complete should the soils and groundwater beneath the site be contaminated. Absence of significant contamination beneath the site would suggest that a source-pathway-receptor scenario is not present at the site.

4 Site Investigation

4.1 Introduction

A site investigation was undertaken on the site by GEA in September 2006. The site investigation comprised three boreholes, two of which were installed with gas and groundwater monitoring piezometers. The boreholes were drilled to a depth of 7.45 m. At the time of the site work, the former garage building was still present on site and appeared to have an asbestos roof; the building has since been removed from site. A copy of the report (without full appendices) is attached as Appendix A. The findings of the investigation are provided below.

4.2 Site Investigation Findings

The investigation identified the following:

Site Observations

- Made ground to an average depth of 5.0m comprising brown silty sandy gravely clay with abundant ash, brick, concrete, clinker, coal, glass, shell and pottery fragments;
- Alluvium encountered below the made ground and the eastern part of the site and Brickearth encountered in the western part of the site;
- London Clay encountered in one borehole at over 6.0 m bgl;
- Groundwater at depths of between 4.25 m and 6.0 m bgl, settling at approximately 4.0 m bgl; and
- The presence of a disused (empty) waste oil storage tank; the tank is not considered to have been used for the storage of fuel due to the complete absence of any pipework for extraction/pumping.

Analytical Results – Soil

- No evidence of hydrocarbon contamination was detected in any of the soil samples tested;
- Elevated Copper (maximum concentration 270 mg/kg) and Lead (maximum concentration 5,400 mg/kg) were identified in the shallow soil.

Analytical Results – Groundwater

- Results of a test on a single groundwater sample indicated the presence of slightly elevated hydrocarbons (0.08 mg/l compared to the EQS value for mineral oil of 0.05 mg/l).

Analytical Results – Ground Gas

- Soil gas monitoring indicated the presence of slightly elevated carbon dioxide in one borehole at 4.8%.

4.3 Overall Assessment of Site Investigation

The investigation undertaken by GEA appears to have been thorough and well executed. All potential sources of contamination were tested for, based on site history, and all potential receptors of contaminants i.e. soil, groundwater and gas, were assessed. The site investigation appeared to have addressed Condition 6 of the Planning Permission for the site although there is no mention of the Permission in the report.

The findings of the report indicate that only marginal contamination appears to exist on site and remedial measures are only required in proposed areas of garden or landscaping.

4.4 Plausible Source-Pathway-Target Scenarios

The site appraisal needs to address two key concerns;

- does the contamination at the site present a threat to future commercial/residential site users?; and
- does the site affect the ongoing resource potential of the Minor Aquifer or nearby residents?

For human health to be adversely affected there needs to be a plausible source-pathway-receptor linkage that could lead to unacceptable exposure levels. In this instance, the characteristics of the contaminants identified on the site are such that they will be relatively immobile in the subsurface i.e. there were no hydrocarbons that would suggest active volatilisation pathways. Therefore, the only plausible uptake pathway is via direct contact, which is precluded by the proposed building footprint. On this basis it is clear that there is no significant source-pathway-receptor linkage for the ongoing commercial/residential usage.

The current groundwater concentrations indicate that there is no currently measurable impact to the groundwater. The likely influence of reduced infiltration, the contaminant characteristics and the presence of lower permeability geological strata to hinder vertical migration should provide confidence that there is no source at the site that will adversely affect the regional groundwater resource in the future.

4.5 Summary of Assessment

The soil and groundwater results have indicated generally low levels of contamination. Combined with the relative immobility of the identified contaminants, the presence of hardstanding across the majority of the site, the absence of significant groundwater contamination and the presence of the low permeability geological strata (that affords protection to the underlying groundwater by reducing downward migration of contamination), there is considered to be no source-pathway-receptor scenario present at the site.

5 Conclusions and Recommendations

5.1 Introduction

A summary of the conclusions that can be drawn from this study is provided in this section.

5.2 Discussion of Conclusions

The site that is proposed for a new commercial/residential building is located in a central urban area and was previously occupied by a vehicle repair garage.

The findings of the desk study and site investigation indicate that there is marginal contamination at the site. However, the contamination identified does not suggest that significant contamination of the ground and groundwater has ever occurred as a result of the site being used as a vehicle repair garage. It is therefore considered likely that the small-scale use of the site (with minimal storage of oils or fuels) together with the hardstanding across the site has resulted in minimal ground and groundwater contamination.

The proposed building footprint (details of which are currently unconfirmed) will essentially act as a barrier to direct contact with the identified heavy metal contamination within the soils underlying the site, therefore it is only the garden/landscaped for which further precautions would need to be taken.

5.3 Recommendations

Based on the conclusions drawn on the available information, the following recommendations are proposed prior to construction commencing on the site to meet the requirement of Condition 6 of the Planning Permission i.e. to protect future occupiers of the site from the possible presence of ground contamination:

- Verification that the disused waste oil tank has been completely removed from site, along with any surrounding potentially contaminated soil.
- Asbestos testing of surface soil samples given that the former building on site had potential asbestos in the roofing material.
- A review of the building proposed for the site; should open areas of garden or landscaping be proposed, the soils in these areas should be removed to a depth of 1.0m and replaced with suitable clean material.
- Given the potential for elevated carbon dioxide in the shallow soils, the building proposed for the site should incorporate sufficient gas protection measures.
- During site construction works, where humans will be in contact with the shallow soil, the findings of the site investigation should be provided to the earthworks contractors to allow suitable personal protective measures to be incorporated into the working methods for site personnel in order to reduce the exposure risk to the heavy metals.

6 References

1. Planning Policy Statement 23, Planning and Pollution Control, ODPM.

2. Model Procedures for the Management of Contaminated Land, CLR 11, Environment Agency and DEFRA, 2004

APPENDICES

A GEA Site Investigation Report